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The Preservation of Soil-moisture.

IN our issue for July 5th it was stated that the approved modern practice among farmers and gardeners is to stir the surface of the soil in order to preserve the soil-moisture to be used by the roots of the crops. The theory upon which this practice is based is, that water rises freely through a well-compacted soil by capillary action, and when it reaches the surface it passes off into the air in the form of vapor. When that surface is stirred, the capillary connection with the moist soil below is measurably broken, and although the layer of soil which has been stirred gives off its water more rapidly at first because the surface exposed to the air is increased, this layer becomes an effective mulch when fairly dry, and thus checks the evaporation of the water which rises from below.

Since the publication of this article we have observed in some agricultural papers that, while the practice is not condemned, the theory is disputed. It is argued that if one wants to dry soil for any purpose he naturally keeps stirring it, and that the more any soil is stirred the more quickly it dries out. The fact that a certain layer of the soil is called a mulch does not make any material difference between that portion and the part that lies under it. That surface tillage prevents the waste of moisture is said to be a fallacy which common observation disproves; for if a man walks across a piece of plowed ground it is well known that his foot-prints will remain moist long after the surface of loose soil around them is dust-dry. Now, this illustration rather corroborates than disproves the theory. The moisture in the foot-prints plainly comes from water below the surface. Plainly, too, as soon as the water reaches the surface it begins to evaporate. The foot-prints remain damp, therefore, because the water rises there faster than it passes off in invisible vapor; that is, the foot-prints are damp because the soil-water is being more rapidly lost at that point than in the surrounding field. In some most interesting experiments made in the Wisconsin Station two years ago it was shown, among other things, that where a heavy roller is passed over plowed ground the rolled ground contains less water than that which is not rolled, the difference in percentage of moisture being greater when three or four feet of soil are included in the sample tested than when a depth of but two feet is examined.

But, as we stated in the article alluded to at the outset, some of the most difficult problems in physics are involved in the movements of water in the soil, and we have much to learn. The first practical question which demands a decisive answer is, How deeply should the surface be disturbed? Plainly, the mulch can be too thin; that is, cultivation can be too shallow to produce the best effect. The consideration of this point is suggested by the Report of the Wisconsin Experiment Station for 1892, which has just come to hand. In an experiment there recorded one cultivator was set so as to slice off and lay back upon the surface rather less than an inch of earth at each cultivation. Another one was made to penetrate to a depth of three inches. The soil experimented on was a well-drained clayey loam, and at planting-time the water-table was four feet below the surface, and when the corn was cut it was from five to six feet below the surface. Corn was planted in rows three and a half feet apart, and strips three rows wide were cultivated with the two implements alternately. On August 27th the result showed considerably more water in the samples of soil taken from the plats which had been cultivated three inches deep than from those which had been cultivated less than one inch deep, and a still greater difference was found in similar samples taken September 16th. This seems to prove that while cultivation to the depth of one inch may do some good, it does not preserve as much water in the soil as if the field was cultivated to a depth of three inches. It is possible that for many crops three inches would be too deep, because of the danger of excessive root-cutting, and the actual depth to which the ground should be stirred in any case should vary to meet different conditions.

What we wish to call attention to particularly, however, is the fact that the difference of the quantity of moisture under the two kinds of treatment was greater in the fourth foot than at any point above it. This shows the important truth that different ways of cultivating the surface affects the quantity of water to and beyond the depth of five feet—that is, throughout the entire depth occupied by the roots of cultivated crops. In another part of the same report it is shown that the ground-water oscillates every day apparently in sympathy with the changes of temperature. It had been already demonstrated at this station that when a plowed surface is compacted by rolling, the ground warms more rapidly and more deeply than it does when it is covered with a mulch like that produced by surface-tillage. It is also shown that when the soil becomes warm its water-holding power decreases and the capillary water drops to a lower level. When the temperature falls the water is lifted higher, so that even the tile drains on the farms of the Wisconsin Experiment Station discharge water faster or slower as the soil warms or cools. In addition to the fact, then, that by surface-tillage evaporation is diminished, we have the other important one that this cultivation keeps the soil below the surface cooler, and in this way strengthens its capillary power, so that less water which falls as rain percolates downward out of the reach of root-action. Besides this, the stronger capillary force helps the movement of deep soil-water upward and through longer distances, so that more water in a dry season becomes available for growing crops.

As to the practical use of experiments of this sort there can be no question. We have before stated that in most of our agricultural lands throughout the entire season evaporation from any given area is about as great as the rainfall, so that it is probable that during the growing season of most crops evaporation largely exceeds the rainfall. Professor King, in the report to which we have just alluded, states that we rarely have water enough in our soil under natural conditions to realize even approximate possible returns from our lands. This shows why irrigation, wher-

ever practicable, should be attempted. But where this is not possible, the proper husbanding of soil-water is a matter of commanding importance in the practice of agriculture or horticulture. Inasmuch as no food can be taken by the roots of a plant until it is dissolved in water, we cannot study the subject too closely, and before we can adopt a thoroughly rational basis for different methods of cultivation, we have much to learn on such points as the amount of water needed to produce a pound of dry matter in any crop, the storage capacity of different soils, the laws controlling the movement of ground water, the root systems of different crops, and the lateral and vertical extent through which they feed.

The Benton Harbor Melon Industry.

RATHER more than sixty miles north-east of Chicago, upon the Michigan shore of the lake, lie St. Joseph and Benton Harbor upon opposite sides of the St. Joseph River. The region about these towns has long been famous for its fruit. It is the oldest commercial peach region in Michigan, and one of the oldest in the west. It was here that the yellows appeared many years ago, and finally destroyed the peach industry. Then a most diversified horticulture arose, largely devoted to berries and grapes, and the region is now one of the most interesting of the horticultural tributaries of Chicago. During the last twenty years an extensive truck-gardening industry has been established here. The chief crops, in the order of their commercial importance, are muskmelons, tomatoes, early turnips, and asparagus, while potatoes, beans and many early garden crops are grown extensively.

The most instructive feature of the muskmelon industry here is the origination of the melon now widely known as the Osage. I have never seen a better example of the confusing effects of a cross, and the progressive influence of selection, than is afforded by the development of this melon under the hands of Mr. Roland Morrill. In 1872, Mr. Morrill, who was quite ignorant of farming, began to raise melons, and planted the crop at a venture, upon rented land. The year before, a neighbor, William Rose, had grown a few melons for market, and this was the first attempt at growing melons commercially about Benton Harbor. Miller's Cream, a long smooth variety of good quality, was the melon then cultivated. It lacked in shipping qualities and some other particulars, and the few persons who had become interested in the subject looked for another variety. About this time the seeds of a melon grown in the country along the Osage River, in Kansas, were brought to Benton Harbor. This melon was black-green, with a very thick, sweet, yellow flesh, and had great value, but it was small and round. A natural cross was made between the two varieties by Mr. Rose and Mr. Morrill by planting the two kinds of melons together. From the product Mr. Morrill carefully selected seed-melons, having in mind an ideal type. He had no thought at that time of originating a new melon, but rather of improving upon the old ones. To get earliness the stock was again crossed with Christiana, a round, netted, good melon, but having flesh which breaks down, or becomes soft, in shipping. The new type was desired, above all, to be solid and durable, to have a thin rind, protected with a moderate netting, and to be egg-shaped, for easy and pleasant handling, packing and eating. Even now, five years after this new melon has been introduced under the name of Osage, Mr. Morrill selects his seed-melons from every wagon-load which comes to the packing-shed with a minuteness of inspection which would astonish any ordinary gardener. If a melon is too long or is yellow in the channels, it is too near Miller's Cream; if rounded and dark and inclined to be small, it is too near the original Osage; if it tends to yellow up in ripening or is heavily netted, it has too much Christiana in it. Its weight indicates its solidity and carrying qualities, and a typical Osage should weigh four pounds. Thus, a pile of melons, which looks to the visitor to be remarkably uniform, yields a dozen secrets of parentage and bad blood to the practiced eye, and it is remarkable how firmly those old crosses have impressed themselves upon the offspring. All this illustrates the law, which is so often forgotten, that careful and long-continued selection is the one potent factor in the amelioration of plants. Crossing simply starts off new variations, and years of patient effort may be required to establish any one of them. The operator must have an exact and unvarying ideal in his mind, to which he works uniformly year by year. It is not enough that he selects good products, but he must have the precise shape, size, color, and other characteristics of an ideal in his mind continually.

In 1888, Mr. Morrill sold the first seeds of the new melon to Mr. J. C. Vaughan, who introduced it. It had previously been called the Osage in the Milwaukee market. It is a delicious melon, and as I ate it at Benton Harbor I thought it the best I have ever known. Its flesh is remarkably firm, thick and sugary, and lacks entirely that soft, fibrous and mushy texture of the Montreal Market, Hackensack and other popular varieties. The flesh is edible almost to the exterior, and upon the under side it would stand paring down to the thinnest rind. For a melon of its size and weight, the interior cavity must, of course, be very small, and this is one of its strong points as a shipper. These opinions, formed where the Osage is at home, may need some modifying in other places; but whether the difference in melons of different regions comes from differences in soil or climate, or management, or in the seed, I cannot say. Mr. Morrill is sure that some of the Osage melon-seed stock which has been sold is not true to type.

Melon-growing is now a large industry in this region. The melon land so far developed all lies north of the St. Joseph River, back of Benton Harbor. It extends from three to fifteen miles inland from the lake. The ideal melon land is a strong gravelly loam, and if it lies somewhat low and flat so much the better, provided it is well drained. During the melon season just closed about 4,000 boxes and nearly as many baskets were shipped from the one port every day. The boxes are supposed to measure one bushel. These are really crates with three pieces of 12 x 12 inch heading, and are 20 inches long, the bottom being a solid piece, the sides and tops each comprising three slats. The material costs five cents a box "in the flat," and seventy-five cents a hundred to make up, and each box consumes half a cent's worth of nails. When filled, the boxes are supposed to weigh fifty pounds. Osage and Hackensack melons are packed in these boxes, and from twelve to sixteen Osage fill a box. The Netted Gem, which is considerably grown, is shipped in half-bushel Climax baskets. Although this enormous crop now finds market, usually at remunerative prices, none of the growers had ever sold all they grew until Mr. Morrill did so in 1881.

The Osage melon is somewhat more difficult to grow than Christiana and other sorts, for it requires strong soil or liberal fertilizing, and the young plants are tender. Mr. Morrill sows his seed about the 15th of April. Two or three seeds are planted in a "plant-box," which is a box made of basket material, at the basket-factories in Benton Harbor. The box is a five-inch cube. These are made cheaply and are used only once, being left upon the ground in the field when the plants are taken from them, where they decay in a year's time. This box is partly filled with good compost, which is tamped, and the space above is then filled with woods-earth, in which the seeds are planted. These boxes are placed in cold frames, and when the plants are well established all but one are removed from each box. About the 20th of May the plants are set in the field, only one plant going in each hill. At this time the plants should have developed two or three runners to the length of one to three inches, and the first (staminate) flower should be about ready to open. The least distance apart at which the Osage is planted is five by five feet, but Mr. Morrill produces better melons by giving more room, and he thinks that seven by seven feet may yet be found to be the ideal distance. The land should not have been cropped with melons the previous year, and it is well to plow under a Clover sod for the melon crop. Mr. Morrill showed me a large field upon which a very heavy growth of Mammoth Clover is standing, all of which is to be turned under for the benefit of next year's melon crop. It is a common practice to apply a shovelful of manure to each hill, but more permanent and uniform results are obtained when the fertilizer is applied broadcast. The most popular fertilizer is stable-manure, after which come commercial fertilizers and home-mixed preparations. Sheep and hog manure from the Chicago stock-yards is delivered in Benton Harbor for $1.00 per ton. If the land is in good tilth, it is necessary to hoe the crop only once or twice; but the cultivator must be run from four to eight times, and after the vines have covered the ground, the large weeds must be pulled. The Osage melon begins to ripen the first week in August, four or five days later than the Early Hackensack. Landreth's Extra Early Citron Melon, which is now called Early Jewell by some growers, is three weeks ahead of Osage, but it is inferior in quality. The melons are ripe when they part freely from the stem, and the operation of picking consists in pressing off the stem with the thumb.

The harvesters pick the melons in bushel-baskets and carry them to the edge of the plantation, or to the various cross-

drives, and empty them into piles, from which they are loaded into wagons. They are then drawn to the packing-house, where they are emptied upon a long table covered with hay or straw. The packer now selects the melons into two grades, being very careful to use only melons of the highest excellence and greatest uniformity of shape, size and color for the first grade, which is to go to market as "Guaranteed Pure Osage" and "Guaranteed Straight Packing." The melons must be placed so firmly in the crates that they cannot settle and become loose. A good packer is able to tell at sight the quality of a melon and to judge if it will fit well into a certain place; he, therefore, avoids unnecessary handling of the melons and works rapidly. An expert packer, in the best of the season, can pack fifty crates an hour, although twenty to twenty-five crates an hour is considered to be quick packing. The second quality melons are again graded down to tolerable uniformity in size and shape, but they are usually sold without the name of the variety or the grower. As in all other crops, there is great difference between the grades of the different growers. This was apparent in running over the boxes as they were piled in tiers in the boat on their way to Chicago, and it explained the differences in prices which the various shippers receive. An acre of Osage should average about two hundred cases of marketable melons, or about 2,400 to 3,000 melons. For the last twenty years the average net returns to the grower have run from sixty-two cents to $1.05 per crate. Mr. Morrill is the largest grower. This year he has twenty-five acres in melons, and he has grown as high as sixty acres in one year. He now saves the choicest of the melons for seed, with which he supplies much of the market. The melons are cut in halves and the contents scooped out with the hands into large pails or barrels. Or if the melons are to be sold to local consumers, one segment of the melon is cut away and the interior is taken out with a tablespoon. The pulp is allowed to remain in the barrels only until fermentation begins, at which time it is floated off and the seeds are washed out. The seeds are then spread upon a wire screen out-of-doors to dry; racks are arranged in the packing or other sheds upon which these screens can be laid during a storm. About thirty Osage melons yield a pound of seed. It is often said that these Benton Harbor growers plant Cucumbers with the general melon-crop in order to spoil the seeds, so that the public cannot obtain them freely, but this is an error. There is no evidence that Musk-melons and Cucumbers ever cross, and although Mr. Morrill once believed that they did, he is now prepared to abandon the opinion.

The enemies to melons at Benton Harbor are the striped beetle and a blight which dries up the leaves. The beetles are kept away by dusting the plants with lime into which just enough sulphur has been stirred to give it a yellow tinge. For the blight no remedy has been found, and Bordeaux mixture does not appear to check it. It is undoubtedly a bacterial disease. Upon new lands, near woods, woodchucks are often serious pests. They eat the runners and bite holes from the young melons when they reach the size of an egg. The urchin is not a serious enemy to melon-growing here, for the acreage is so great that he cannot compass the entire subject.

Mr. Morrill, who has been the chief means of developing the trucking interests of Benton Harbor, is yet comparatively a young man, and he now finds himself well-to-do, and in demand for important work in his town and state. He is largely interested in fruit, and is the largest, and probably the best, blackberry grower in Michigan. His Blackberry-plantation now covers forty-two acres, of which seven acres are in Wilson's Early, and thirty-five acres in Early Harvest. Mr. Morrill is fortunate in having started with no knowledge of the business, for he was free from the traditions and conservatisms which chill the enterprise of many farmers and keep them from making progress.

Cornell University. *L. H. Bailey.*

California Railroad-station Gardens.

A FEW years ago there was hardly a railroad-station garden or park in California, except a few in the southern part of the state, which were partly or wholly maintained by private enterprise to help the sale of town-lots. Now there are many worth notice, though the state is so large, and so sparsely settled in parts, that no railroad company, however wealthy, could immediately establish gardens everywhere. The rule appears to be that the most progressive communities get the first station-parks.

The Southern Pacific Railroad has spent, and is spending, a vast sum annually to beautify choice spots around its principal stations, and it has a wide range of soils and climates to choose from. At Los Angeles, at the main station, the large grounds attract much notice. Two fine desert Palms, planted in old Spanish times, still remain. The lawn is set with a good collection of semi-tropic trees and other plants. Camphors, Araucarias, Hakeas, Casuarinas, Cannas and Caladiums are conspicuous. There is a triangular space planted with Yuccas, Cacti and other Arizonian plants, brought from the desert. Pomona has a particularly attractive square at the depot, where Roses bloom all winter. Ontario and many other towns of southern California, and even newly started villages, are making the station-grounds interesting, if only by Palms, Grevilleas and Magnolias.

Along the ocean, where the problems before the railroad gardeners are often exceedingly difficult, the abundant use of succulents, such as the Mesembryanthemums, and of Bamboos and Eucalypti is quite general. Where the water-supply is good, one sees many and magnificent Passifloras, Tacsonias, Ipomœas and the tropic Hibiscuses. It is a common thing at this season, September 12th, to see a trellis or fence covered with the ripe golden fruits of some of the edible Passifloras. Acres of Bamboos planted closely in shifting sands have been of great value, if sufficient water can be had to establish their growth.

In the San Joaquin Valley no railroad-station is more attractive than that of the one at Merced, a few years ago a barren waste of several acres. It has been changed with great rapidity to a mass of shrubbery and stretches of lawn. The so-called Umbrella-trees, from the southern states—a regular form, I believe, of the old Pride of China, Melia Azaderach—are becoming the characteristic tree of the San Joaquin region, and no one can overlook their dark, dense, regular appearance.

Some of the most beautiful gardens of the Southern Pacific Railroad are on the Monterey line from San Francisco, past San José to the ancient capital of the state. Along "the peninsula," as San Mateo County is often called, there is a more finished and cultivated aspect about the little railroad-stations than in any other part of California. San José never had the land for more than a bit of green lawn. Castroville has a very picturesque large garden wilderness, overgrown and full of bloom at all seasons, a bower of Roses, Dahlias, Carnations and nearly everything that could be gathered together in the district. Every year a few more stations begin to make gardens, and the old ones are kept up and improved. It is certain that the railroads are spending large sums to beautify their grounds, and the time will come when one of the special features of travel in this state will be the horticultural variety displayed in the thousands of small railroad gardens and parks scattered along every valley and mountain pass from San Diego to Siskiyou.

Niles, Calif. *Charles H. Shinn.*

Foreign Correspondence.

Lilies at Kew.

THE systematic cultivation of Lilies on a large scale at Kew is a somewhat recent development of the outdoor gardening in that establishment. Formerly many attempts were made to grow them in specially made beds in that portion of the gardens devoted to the cultivation of monocotyledonous plants, but these all failed, and so—with the exception of a few species which thrive even under the most depressing conditions—Lilies played little or no part in ornamental gardening at Kew until within the last six or eight years. The success which has attended the new departure, and the wonderfully fine effects produced by masses of the showier species and varieties, are so great that an outline of the methods pursued may be of general interest.

Soil and Position.—Most of the Lilies at Kew grow well in peat; some few refuse to grow in peat, but do well in loam; some do equally well in loam and peat. But, generally speaking, the key-note of success was struck when the bulbs were planted among low-growing shrubs. Behind the Palm-house is the so-called "American Garden," containing masses of Ericaceous and other plants in large beds; among these are Rhododendrons—low-growing species—Azaleas, Ledums, Callunas, Ericas, Pieris, Leucothoë, Daphne, etc. These shrubs serve a double purpose; they keep the ground cool about the Lily-roots and shelter the young growths from the late spring frosts. Every few years, as the shrubs grow too dense, it is necessary to re-

plant them and space them out properly, so as to give the Lilies a fair share of light and air. Replanting, by the way, is better than pruning, as each time replanting takes place a number of fine shrubs are obtained, which are available for new plantations. At the same time the Lilies—at any rate, the great majority of them—pay for being lifted and replanted, the smaller bulbs being retained and placed in nursery-beds to grow on. Lilium auratum is one which prefers being let alone, and, given a well-drained peat bed, should not, if possible, be disturbed. L. auratum, by the way, being a taller grower than most of its congeners, we grow in beds of taller Rhododendrons than those which find a place in the "American Garden," and these can, from time to time, be pruned in so as to allow the Lilies light and breathing-space. In the beds of Rhododendron—principally hybrids of R. Ponticum—along the Broad Walk we have had hundreds of stems of L. auratum six feet high (many have attained eight feet or more), with fifteen to twenty, or even more, perfect flowers; this year, however, owing to the excessive drought, few stems have attained the dimensions or have produced the number of flowers just mentioned. L. longiflorum does best with us in peat and must be replanted every second or third year, or there would be a falling off in the size and number of the flowers; the fact is, the bulbs increase so fast that they crowd each other out and impoverish the ground—the small ones are planted at once in other beds or are grown on in nursery-beds for stock. L. speciosum and its numerous varieties increase so rapidly that they quite exhaust the ground; replanting is necessary every second, or third year at the outside. Fresh peat should be added and only some of the large bulbs replaced; the others may be at once utilized for forming new plantations.

Raising from Seeds.—The bulbs of some Lilies, after flowering well for several seasons, disappear apparently without cause, and the better and the more freely have they grown and flowered the more apt are they to disappoint their possessors. It seems probable that the bulbs of these kinds are in reality always rather short-lived. An excellent way to keep up a stock of young, vigorous bulbs is to make a sowing every year. If treated properly, seedlings arrive at the flowering stage very quickly. The seeds should be sown as soon as ripe—if possible, in prepared beds (not in pots or pans) under glass. A cold frame will do well, but results are more speedily attained if seeds are sown in a bed in a slightly heated greenhouse. For instance, seeds of Lilium longiflorum, var. Formosanum, a beautiful variety from Formosa, developed rapidly, some seedlings flowering in little more than a year from time of sowing. The bulbs in that time had attained about the size of small hazel-nuts; last year they were planted in the open ground, and during the past summer have flowered profusely.

Scales and Bulbils.—The former method of propagation—when seeds are not to be had—is one which allows the stock of a given kind to be rapidly increased. A good-sized bulb will furnish a large number of scales, each of which may develop into a good bulb in two or three years. The scales should be planted in silver sand—over-prepared soil—and kept in a frame or greenhouse until young plants have developed, when they are better planted out in the open ground. The third year from scales we have had L. Hansoni five feet high, bearing from nine to twelve flowers on a stem. Bulbils, as of the Tiger-lily (L. tigrinum) and L. sulphureum, furnish an easy way of propagation; the former will flower the second year from the bulbil, all that is necessary with the Tiger-lily being to sow the bulbils when ripe in the open ground and leave them to their fate. A slight covering of Fern-leaves, etc., during winter is, however, beneficial. With L. sulphureum—owing to its being much more uncommon—we act differently, planting the bulbils in pans or beds under glass. The first year these will get as large as small hazel-nuts—after this they are better planted outside; some planted out this spring in an Azalea bed, fully six inches deep, have grown freely this past summer, producing numbers of bulbils, which, in their turn, will be carefully treated as above described. They will, doubtless, flower well next year.

Lilies which Grow Best in Loam.—The Martagon Lily, L. Martagon, and its varieties, album and Dalmaticum, will not grow in peat at Kew, but do well in loam. The Tiger Lily, L. tigrinum, and its varieties, although they will thrive in peat, do well in almost any garden-soil. The Pyrenean, or Yellow Martagon, as it is sometimes called, requires loam; if chalky in character so much the better. L. testaceum and L. candidum like good loamy soil. L. pardalinum grows very freely in a damp loam; the third year we have had it seven feet high, with thirty flowers on a stem; when this species is transplanted, unless clumps are moved with masses of soil attached to their roots, it is never so fine the succeeding year; one must wait until it is thoroughly established before the best results are obtained. L. Hansoni will grow well even in a hot dry spot. The Scarlet Martagon, or Scarlet Turk's-cap, L. Chalcedonicum, and its varieties, like a moist, but well-drained, good strong loam; this is not an easy species to manage, but where it does succeed it is one of the most beautiful of hardy Lilies. L. croceum, the Orange Lily, does better in loam on a damp subsoil than in a bed, no matter how well prepared, on a dry gravelly or sandy subsoil; it is a beautiful plant, and by no means common in gardens. L. Davuricum and the numerous forms of the garden L. umbellatum thrive admirably in almost any garden-soil; among dwarf-growing shrubs, as recommended at the commencement of these notes, the bulbs increase in size and number to such an extent that, although planted originally six or eight inches below the surface, in about three years they will almost lift themselves out of the ground. The Chinese L. Henryi grows in both peat and loam; in peat, two years after planting, the stems measured five feet in height, and bore as many as nineteen flowers; in loam, however, the second year after planting, the stems had attained a height of six or seven feet, and some bore upward of thirty flowers. L. candidum, as far as Kew is concerned, is one of the most refractory of Lilies; imported bulbs flower well the first season, but afterward, as a rule, fungal disease attacks stem and leaves, and both dry up and wither before the flowers open. L. longiflorum will grow well either in loam or peat, and L. Sovitsianum likes loam with a clay bottom.

Lilies which do Best in Peat.—First and foremost is the golden-rayed Lily of Japan, L. auratum, which has already been mentioned. L. superbum, a noble species, with which, doubtless, your American readers are familiar in a wild state, does best in peat with us; the second and third year after planting it has reached seven feet in height and upward, bearing from twenty to thirty flowers on a stem. Some seasons many of the bulbs will remain perfectly dormant, but the following season they will start again. L. Grayi, from Roan Mountain, does not, as far as my personal observation and inquiries on the spot go to prove, ever attain anything like the proportions in a wild state that it does at Kew. We have had our bulbs since 1891; they were planted early in that year in a bed of Azalea amœna, and most of the stems bore but one flower; the following year the flowers numbered from two to five on a stem; the present season the stems have grown five feet high and borne from five to twelve flowers each. The little Japanese L. concolor (bright scarlet) and its variety, Coridion (bright yellow), the second year after planting among Dwarf Azaleas have grown two feet high and borne from four to six flowers on a stem. L. speciosum and its varieties like peat, but soon deteriorate unless replanted and the smaller bulbs removed; with this species not more than two years should elapse without replanting. If arranged in clumps among low shrubs it is easy to move the clumps a foot or two, and so obtain fresh soil for the hungry roots to work in. The second year after planting we have measured L. speciosum, and found the stems to be five feet high, bearing from twelve to twenty flowers. L. Cana-

dense, L. elegans and its numerous forms, L. Brownii, L. Japonicum, L. pomponium and L. sulphureum are other Lilies which, in Kew at least, do best in peat.

London. *George Nicholson.*

Plant Notes.

Nymphæa tuberosa.

NYMPHÆA TUBEROSA has already been figured and described in Garden and Forest (vol. i., p. 368), but the accompanying illustration from a photograph will appropriately supplement the botanical sketch.

As has been noted before, this native species bears very large flowers, only equaled in size among the hardy white Water-lilies by the southern form of N. odorata, known as the Rice-field Lily. In form, however, the flowers of these two species are quite distinct, the latter having more numerous, narrower and pointed petals. All forms of N. odorata are apt to have a more or less distinct trace of pink, especially on the outer row of petals, but no trace of color has been observed on the flowers of N. tuberosa. The flowers usually have merely a faint odor; the leaves are green on both sides, and are borne usually on strong petioles. The root-stocks are stronger than those of N. odorata, and bear numerous spontaneously detaching tubers, which, while useful in the struggle for existence, are objectionable in a limited water-space, where this species will quickly take complete possession. For this reason, other forms of white Nymphæas are usually favored by cultivators. The English botanists point to N. tuberosa as one of the parents of Marliac's N. chromatella, but this origin is denied by him. While N. chromatella forms very numerous buds, it does not seem to form the peculiar spontaneously detaching, and sometimes compound, bulbs so peculiar to N. tuberosa.

Cultural Department.

Autumn Planting.

AFTER such a protracted dry season it is fair to assume that there will soon be a good deal of wet weather, and the intending planter has, therefore, no time to lose. Thinning out old plantings or making new ones should be attended to at once, and a large majority of herbaceous plants will become established in their new locations before the ground freezes, and will start away better in the spring than if planting is left until that season.

The autumn planting of Roses in the open in New England is, however, in my opinion, a mistake. Unless the wood of established Roses is thoroughly matured, especially the late growth, even these are liable to be killed down to the roots, as was proved last winter with a lot of year-old plants of Hybrid Perpetual Roses on their own roots. They were well protected with straw, but the shoots were vigorous and immature, and the result was that all died. A similar lot this year will be lifted and the roots placed in sandy soil in the cellar, to be replanted in April as soon as the ground can be worked. About three hundred American-grown Rose-plants were used in our fall plantings in 1890 and 1891, some on their own roots and others budded, according to variety. The plants were earthed up with soil just before frost came, and covered lightly with straw. In each case one-third of the plants were either killed or so badly injured that they had to be replaced in the spring. I have no doubt that others have had the same experience, but a great deal is still heard about planting Roses in the fall, as though it were the most approved season for this work. Believing that orders were filed by the growers in the order of their receipt and that the best plants would go to the first purchasers, our orders were placed early, so as to secure good plants. This plan I should again follow, but on receiving the plants they should be heeled in, either in a cool cellar or cold frame. If in a cold frame, the tops should be covered with dry leaves. In the spring they will come out bright, with the buds just beginning to swell and the roots in good condition.

As to the value of budded plants, compared with own-root plants, it has always seemed to me that the best and quickest results are obtained from budded plants. The wild Brier has to be looked out for, but shoots from the Brier-root can be detected at a glance and removed, and as long as these intruders are under the soil they will do no harm. We grow several hundred Hybrid Roses for forcing; all the best are kept in flats about six inches deep. Some are on their own roots, others budded, and others again grafted on the roots of the Baltimore Belle. Those on their own roots are the weakest, and the last-named are by far the strongest, making growths over six feet high. These are now thoroughly ripened by keeping the soil rather dry when growth is finished, and in rainy weather the boxes are stood on edge. The plants treated in this way are started when the Chrysanthemums have finished flowering. We get one crop of excellent Roses in March, and as they are not pruned low down the lower buds start and give a second fine crop later; sometimes a scattering of good blooms is gathered later in the season from the plants treated in this way. These Roses require considerable care during the summer as to moisture, but the results are so satisfactory that we shall grow fewer in pots in the future, and then only for later crops. The growing of Roses in boxes has much to recommend it, for few private establishments can spare a house for hybrid Roses the year round, when there are so many uses for a glass structure in summer. To have good Chrysanthemum-blooms, these also must be grown entirely under glass. The culture of Violets in frames may also be counted among the lost arts unless some better means can be devised for fighting the dread disease than those we now possess.

South Lancaster, Mass. *E. O. Orpet.*

Single Dahlias.

THAT single Dahlias are more graceful than double ones cannot be denied, but grace is only one quality of a flower, and there are others in which the double varieties excel to such a degree that I marvel when I find persons condemning them altogether. I do not see how any one can examine closely a well-grown flower of such double varieties as, for example, A. D. Lironi or Pre-eminent, without thinking the couplet wrong which declares—

> Whoever thinks a perfect piece to see,
> Thinks what ne'er was, nor is, nor e'er shall be.

Almost everybody knows that the doubling of a composite flower is not the transformation of a part of the floral organs into petals, but is the addition of a petal to each of the small florets of the disk; so that a double Dahlia is as complete in all essential parts as a single one. The single kinds are usually freer bloomers than the double ones, and the quality of the flowers seems to be less affected by the weather, yet it should be remembered that not until the nights grow cool and the droughts of summer have passed, do Dahlias of any class appear at their best. A July Dahlia-flower is almost always worthless; if it ought to be double it comes semi-double; if single, one or two petals will be undeveloped, or they will be curled at the edges or they will be irregularly set on. It is often said in gardening papers that single Dahlias are best treated as annuals, that is, raised from seed every year, but with this I do not agree. I raise scores of them annually, and though I use seed of the best kinds only, very few of the seedlings yield good flowers. Poor ones will be showy at a distance, it is true, but there is no pleasure in seeing them at the farther end of the garden, knowing that there is not one among them that would please you if near at hand. It is a very easy matter to raise any quantity of seedling Dahlias, but it is not easy to raise a good one.

A single dahlia should not be too large; White Queen, which was long the best white, had this fault; a diameter of three inches is large enough; its color or colors should be clear and unmixed; many of the yellow, pink and white varieties are not so, but are disfigured by small dots or lines; its petals should be broad enough to make a smooth outline, as little notched as possible.

It is easy to laugh at these requirements, but I am sure that everybody would acknowledge the superiority of such flowers as I have described, if they were to see them side by side with others which lacked these features. Some florists in England have of late endeavored to introduce "Single Cactus Dahlias," having long, narrow, twisted petals. I have not yet tried them, but I have noticed that though these have been exhibited at shows they have not, so far, received certificates of merit.

For general purposes, whether for garden adornment or for cutting, flowers having only one color are, I think, preferable, but a few of two or more colors will add interest. There are, as far as I have observed, three types of parti-colored flowers:

those which have the base of the petals differently colored from the tip, and shading imperceptibly from one tint to the other, or else changing abruptly so as to form a ring around the disk; those which have the edge of each petal, from base to tip, of a distinct color from the central portion; and those whose petals are marked longitudinally throughout with narrow stripes. In all of these types, especially the last two, occasional flowers will be found where one color seems to have expelled the other. In some seasons the fine Chilwell Beauty loses the orange centre from its petals, and the flower becomes simply crimson; Theseis, a white flower with longitudinal purple stripes, frequently becomes all white or all purple; Gulielma, which, when in full character, is a white flower with buff-edged petals, is most frequently seen without the buff. The complaint is sometimes heard that single Dahlias are not suitable for cutting because the petals drop so quickly, but if cut before the central florets open the flower will last several days; indeed, the petals will wither in their place rather than fall.

There are several strains of single Dahlias differing in their manner of growth and abundance of flowering; two of these are so superior that I use very little seed of any other. One of them makes a close, thick, round-headed bush, from three to three and a half feet high, flowers most profusely, and throws all of its blossoms a foot or so above the top of the plant. The colors are as varied as the genus can give, and good flowers are as frequently produced as by other strains, but no more so. The other makes a less compact plant than the first, but still not an awkward or rambling one. I value it especially for its remarkably elegant foliage, which is beautifully cut, and frequently of a bronzy hue. The flowers of this strain are almost always deep crimson, but a little variation is beginning to appear.

As the season for lifting Dahlias is approaching, it may be well to say that the roots ought to be turned stems downward as soon as the tops are cut off, and kept so until spring; the losses of Dahlias during the winter, otherwise than by freezing, are mostly caused by neglect of this precaution.

Canton, Mass. *W. E. Endicott.*

Fig. 62.—Nymphæa tuberosa.—See page 415.

House-plants.

AMONG my rather numerous plants there are none which are more thoroughly satisfactory than those which we use for house-plants in winter. Tried friends these are, in both acceptations of the phrase. Plants which will continue thrifty under conditions prevailing in a modern house are not very numerous, but, happily, one can have a choice of available plants which are not only handsome in form, but which will prove satisfactory under adverse conditions. It is some years since I ceased the struggle to grow soft-wooded flowering plants in the house, for the first requisite to success with these is that the temperature and conditions of the house should be

regulated somewhat as to their requirements. Few, if any, of this class of plants thrive under great changes of temperature or survive aridity or contamination of atmosphere. It is only those plants with harder leaves and wood which have a capacity of endurance in a house heated by a furnace and lighted by gas. A plant which will not accept cheerfully the usual morning airing at anything above the freezing-point and preserve its serenity as the temperature marks eighty degrees, under the influence of heat and lights, is of no use to us for permanent service. Under such conditions I grow a few well-known plants, and while, after several years' growth, they have not the fine appearance of those grown under glass, they are always in good condition, and amply repay the little care required by them. Nothing is more restful to the eye and more decorative in the house than a noble plant of good form and foliage.

Areca lutescens, one of the most commonly grown Palms, is one of the handsomest and most useful in the house. Once secured in a thrifty condition, it makes a regular growth, and with a fair amount of light will prove superior to very adverse conditions. My plant, four or five years old, is established in a glazed jar without drainage, which is not the best environment for the roots of any plant. Next I fancy Pandanus Veitchii for its all-round good qualities. It has handsome foliage and a somewhat compact habit of growth. It does not grow as rapidly as P. utilis, though this is a very useful plant, of great hardihood, and if grown carefully, to retain its lower leaves, very ornamental. It is apt to outgrow available space very soon, and its serrated leaves are cruel ones to handle in the necessary cleansings. The Chinese Palm, Rhapis flabelliformis, is a species of distinct character, and well adapted to house-culture. Coryphea australis, in a young state, has striking characteristics, and has proven a desirable plant. Phœnix reclinata has rather soft foliage, and seems specially subject to scale. Livistona Chinensis, while making a handsome specimen, is not a plant which will do as well as the above-mentioned kinds under same conditions and treatment. Of course, no collection of house-plants would be complete without India Rubber-plants, the green variety of which will survive any treatment short of actual desiccation. There is, however, a choice among the varieties of this plant, that with the reddish midrib being the best. The variegated Ficus, well colored, is a handsome plant, which not only resents neglect, but is a difficult one to cultivate in good specimen condition. Plunged in full sunlight in the open, with plentiful supplies of water, it thrives, and the leaves become high-colored. At this season, however, with change of temperature or some other cause, the lower leaves are apt to brown on the edges, and in some cases ripen off without browning. Aside from this annual check, however, it is a serviceable plant for the house. Aspidistras seem to have sunk into well-merited neglect and café ornaments. They are undoubtedly proof against every contingency fatal to most plant-life, but are not a joy to the eye. For a formal effect in low front windows I have tried small potted plants of Arbor-vitæ in tile boxes. These did capitally, and the green lines of these plants were a grateful sight in winter. The above list might be enlarged, of course, but the object of this note is only to mention a few tried plants sure to prove satisfactory, as a hint to those who have not given this class of plants a trial. Any of the above-mentioned plants may be had at a very reasonable price, but it will pay to secure well-established sturdy plants which have been grown in pots under glass. An examination of the roots, to see that they are in order, will not be amiss at the time of purchase. As to culture, they require daily attention in the way of water, being kept moist, but not wet, at the roots. Once a week they should be taken to the sink and every leaf thoroughly washed with water slightly soapy. In the spring the top soil should be forked out and replaced with good open loam, into which should be mixed a liberal supply of bone-meal. It is not usually important that these plants should be much stimulated, as in this case they will outgrow their quarters. If in porous pots they may be plunged out in the borders for the summer in a place where they will have a few hours' sun and be protected from high winds. Plants in glazed fancy pots will require overhead covering to prevent them becoming waterlogged.

Elizabeth, N. J. *J. N. Gerard.*

Vegetable Notes.—The variety of Okra known as Velvet is more valuable than the Density is, since the pods grow to edible size earlier in the season, and are of more symmetrical shape. It does not yield "nubbins" toward the close of the season, as the other variety is apt to do. In point of yield the varieties are about equal. With me the Dreer or Kumerle Dwarf Lima has proved both earlier and more productive than Burpee's; but soils and seasons may reverse the matter. Either of these Limas is superb, and will undoubtedly grow in favor. One point, however, must be kept in mind—seed must be carefully selected from the dwarfest plants only, as both varieties show a tendency to revert to the running type from which they were selected, and if care is not exercised plants of dwarf habit will become the exception. One of the best Cabbages for the home garden is the Winnigstadt, either for second, early or late. It grows rapidly, and has good quality and tender texture. Its distinguishing merit is its compact spiral growth, the leaves overlapping each other so quickly and firmly that it seems a difficult matter for even the cabbage-worm to eat into the heads. On account of this same compact habit, few leaves need to be removed when the heads are cut for use.

Geneva, N. Y. *C. E. H.*

Correspondence.

Dahlias not Blossoming.

To the Editor of Garden and Forest:

Sir,—So far as my observation goes, no horticultural journal has noted the fact that the Dahlia has ceased to be a flowering plant, at least in western New York. If Buffalo is not a floral centre sufficiently well marked to determine the matter, certainly Rochester is, and I have lately seen Dahlias in that city acting exactly as ours do. The plants are thrifty enough, but if buds form they all blast.

For several years I have scarcely had three flowers to the plant, and often none at all. This year I have some new sorts, but no flowers. Sometimes the young shoots have the appearance of having been stung by insects, but often buds turn black when half-grown, with no appearance of insect interference. I find that such plants run heavily to tubers. Often an ordinary-sized plant will produce as many tubers as can be found in a good hill of potatoes; whether this is cause or effect I am unable to say, and have failed to devise a means of finding out. I have had no experience with the new single varieties. Unless they or the experts do something for us the Dahlia will have to be retired.

Occasionally a notable exception is observed. At the cottage on Goat Island, Niagara Falls, Dahlias grow higher than one's head and blossom profusely. The soil is a peculiarly rich black loam. On the other hand, a single plant at a farmyard door, with no apparent special advantages, was found so full of yellow blossoms that it fairly lighted up the landscape. These two instances are the only ones that have come under my notice for years of the Dahlia flowering hereabout as of old. Experienced cultivators of it in this city have been obliged to discard it. Who will tell us what is the matter?

Buffalo, N. Y. *John Chamberlain.*

[We have inquired of Messrs. Ellwanger & Barry as to the flowering of Dahlias with them, and they reply that for several years these plants have not flowered to their entire satisfaction in western New York. They attribute the failure largely to continued dry weather, and they also think that growers allow too many stems to proceed from the same plant. Where the suckers are cut off and the plant is trimmed to a single stem a good growth and fine flowers are usually secured. They have not noticed that the plant has received any serious injury from insects or from fungi.—Ed.]

Spring Flowers in Autumn.

To the Editor of Garden and Forest:

Sir,—It seems worth recording that a Horse-chestnut-tree in Central Park is now, September 25th, in flower. The spikes of bloom are somewhat smaller than those of the spring, and delicately attenuated in all their parts, very closely after the manner of the forced flowers of shrubs which florists offer in advance of the natural season of blossoming. The odor of these Horse-chestnut flowers, also, is most delicate, resembling that of Lonicera Tartarica.

The tree in question stands just above the bridle-path north of the new reservoir, close by the little elevated rond-point or circle of observation for equestrians, from which they may look over the meadows below. About one-fourth part of the tree is in flower and young leaf, the remainder being in the usual condition of this season, save that it has no fruit. A

Horse-chestnut next to this one, nearly devoid of leaves, bears two spikes of bloom.

A friend reports that he saw in the Catskills this morning three Apple-trees together covered with blossoms.

New York. *J. E. Learned.*

[The dry weather of the present summer has, without doubt, hastened the ripening of the wood in many trees, and they have prepared for winter earlier than usual. The recent rains have encouraged the starting of a new growth, and this accounts for the fact that the trees are behaving as if it were spring. It is not unusual for Apple-trees to blossom in the fall, but we have rarely seen the Horse-chestnuts behaving as they are doing this year. One of these trees in the City Hall Park has been bearing flowers quite abundantly within a fortnight, and we hear similar reports from various parts of the country.—Ed.]

Hemlock in Minnesota.

To the Editor of Garden and Forest:

Sir,—My return to this region recalls the reference made by Mr. E. J. Hill in your issue of November 12th, 1890, to Schoolcraft's report of Hemlock along the portage from Fond du Lac to the St. Louis River above Knife Falls, and also between the St. Louis and the head-waters of Kettle River. My work has taken me over all this ground, and with the verification of that report in mind, yet I have failed to find any Hemlock in the region except that on Sec. 10, Trip. 48, Range 16.

Much of the region has been burned over, and some of it is covered by a growth of Poplar, Populus tremuloides, from thirty to sixty years old; but here and there much of the older growth remains. If Mr. Schoolcraft mentioned the trees correctly in the order of their abundance he saw a very different forest from that existing now, although many of the present trees are a hundred years old. It is to be regretted that he did not have more favorable weather and that the arrangements of the party were not more to his liking, that he might have had more patience with his notes; also, that he was unable, or did not record his courses and distances by compass and pacing, that he might be followed exactly. It is also a matter of regret that he made the error of reporting Kettle River as flowing into the Mississippi above the falls of St. Anthony, and later reported three lakelets on the Mississippi above Itasca, while one of them is isolated from the stream; for these mistakes make it seem probable that he might make mistakes in other reports also.

We have, however, a report of Hemlock by Archibald Johnson, C. E., August 27th, 1873 (see field-notes in office of Surveyor-General), "trees six to fourteen inches in diameter on the line between Sections 20 and 21, Trip. 51, Range 19," that can be verified to-day. These trees are the farthest north and west of any I have seen of this species. They do not, however, differ remarkably from the common Hemlock of Wisconsin. Specimens from this locality, collected by Mr. W. B. Kirkwood in 1890, are preserved in the herbarium of the Arnold Arboretum, and also in that of the Forestry Division of the United States Department of Agriculture.

It should be said, perhaps, that along the old portage and westward, where Mr. Schoolcraft traveled, the lower branches of Picea alba, growing densely in damp ground, resembles Hemlock somewhat, and I have often approached within thirty feet of a shaded Fir, Abies balsamea, before discovering that it was not a Hemlock.

It can hardly be possible that Mr. Schoolcraft, by Hemlock, meant Ground Hemlock (Taxus), yet he does not mention this abundant shrub in his report.

Carlton, Minn. *H. B. Ayres.*

Recent Publications.

Landscape-gardening in Japan. By Joseph Conder. Kelly & Walsh, Yokohama, Shanghai, Hong Kong, Singapore. 1893.

Mr. Conder is an English architect who has made his home in Japan, and who has already written a number of books and papers on various phases of Japanese art, his best-known book probably being *The Flowers of Japan and the Art of Floral Arrangement.* The present work endeavors to give the western world some idea of Japanese methods of garden-design and decoration, and a short account of the history and development of landscape-gardening in the Mikado's empire.

Landscape-gardening, as Americans and Europeans understand that term, hardly exists in Japan; at least, the sort of landscape-gardening which Mr. Conder tries to explain, and which he seeks to illustrate by means of a number of rude drawings of the Japanese school, is not landscape-gardening in any proper sense of the word, but only children's play at gardening, which bears as much resemblance to the real thing—the reproduction of real naturalistic effects in places and positions where they may be available for the use and enjoyment of the human race—as a Kakimono bears to a picture of one of the great masters of Italy or Holland. The modern Japanese garden, or rather garden-enclosure, for there are no modern Japanese gardens or parks in the broad and true meaning of the term, is a confusion of ceremonial and symbolic motives which, whatever they may mean to the Japanese, are unintelligible to western intelligence, which finds in their pettiness of detail and restlessness of motive nothing dignified or satisfying to the mind seeking the repose of a harmonious creation.

Either the Japanese as a people are singularly inappreciative of the beauties of nature and curiously devoid of the power of enjoying scenery, or Mr. Conder's statement, that "Japanese landscape-gardens may be described as a representation of the natural scenery of the country as it appears to and impresses the Japanese themselves in a manner consistent with the limitation of this art," must be accepted with caution. To the lover of nature few countries in the world present fairer scenes of mountain and valley, rushing torrent and placid wood-embowered lake; in no other country is the forest more harmonious in composition, more varied or more beautiful in its detail. In every direction pictures of exquisite beauty meet the eye of the traveler; and certainly few people surpass the Japanese in their apparent love and appreciation of natural scenery. They possess the power of appreciation just as a child loves the beauty and fragrance of a flower or delights in the dash of a waterfall, while they are as helpless as children to reproduce what they see or admire; and their efforts at gardening are like those of children who heap up piles of sand in imitation of mountains, stick branches of trees in the ground to imitate forests, and set about little stones because stones seem to be a necessary part of the play.

In other days there have been landscape-gardeners in Japan; but these were in the days when Japan was under the direct influence of China, and reflected her art. The so-called Arsenal Garden, of Tōkyō, which has been described in this journal, is certainly one of the greatest artistic creations of its kind, worthy of any master and of any country or age. Perhaps there is nowhere now so perfect an example of oriental landscape-gardening, for the wars which have swept over China in the last fifty years have destroyed many of her best monuments and most precious works of art. We naturally expected to find in a work of this character, supposed to be exhaustive, a plan and some detailed account of this marvelous creation; it is simply mentioned as being among the best-preserved of the Daimio gardens of the capital. Nor do we find any mention of the grounds which surround the temples and tombs at Nikko, an omission from a book on Japanese landscape-gardening which is difficult to explain. When it was decided, now nearly three centuries ago, to bury the remains of the greatest of the Shoguns on the mountain-side above the little hamlet of Nikko, a great artist, whatever his name may have been, selected the sites for the commemorative buildings, to receive which he leveled the side of the mountain, planned the approaches, built massive Cyclopean retaining-walls and broad terraces, and planted that forest of sombre Conifers which has made the burial-place of Ieyasu and of Iemitsu one of the most solemn and impressive spots in the world. No one, whatever his feelings about Japanese architecture or Japanese art may be, can visit the shrines of Nikko without being impressed by the fact that he is in the presence of the work of one of the greatest masters of art who have ever lived, and to whom Japan owes its greatest monument.

Mr. Conder labors to explain the mysteries and meanings of the various stones with which the Japanese are so fond of disfiguring their gardens. We confess that a careful perusal of the chapter on this subject has not had the result of making us understand or appreciate their value or importance, and that this branch of Japanese gardening art is still as much of an enigma to us as it was before.

Mr. Conder very properly commends the Japanese for their sobriety in the use of plants in the decoration of their gardens. They cultivate, as compared with western nations, only the plants of a few varieties. "It is contrary to their principles," Mr. Conder tells us, "to admit into compositions exotic productions with the conditions and surroundings of which they are imperfectly acquainted." But this certainly is only partly true. The Japanese cultivates in his garden the Pines of the country, the Retinospora, the Iris, the Cherry, the Maple and

the Azalea, but nearly all the other plants of a Japanese garden are exotic and have been brought into Japanese gardens from China, which long controlled Japan in every phase of its intellectual life; and in later years, since Japan has become semi-Europeanized, the favorite flowers of the fashionable gardener are the bulbs of Holland and the annuals of German and French seedsmen.

To our thinking, the best parts of Mr. Conder's book are the chapters in which he describes and figures stepping-stones, which in a Japanese garden often take the place of formal gravel walks, and which might often be introduced into our gardens with excellent effect and a great saving in the cost of construction and maintenance; and of garden enclosures or fences which the Japanese usually make out of bamboos, and which are often delightful in their simplicity and neatness; and of garden-gates, of which Mr. Conder publishes several interesting and suggestive designs.

There is a chapter on garden vegetation, which appears to have been compiled from two sources—a florist's catalogue and a botanical list of Japanese plants. Careful editing at the hands of some one familiar with the plants which the Japanese really cultivate in their gardens before the appearance of another edition of *Landscape-gardening in Japan*, will very materially increase the value of this part of the work which, in spite of what seems to us inadequate treatment of the subject and many errors of statement, will be read with profit by students of the garden art and its relation to the artistic and mental character of this remarkable people, who find perhaps in their gardens the truest reflection of their own character and their own limitations.

The Columbian Exposition.

Plants around the Lagoons of Jackson Park.

THE verdurous aspect of the hastily constructed shores of the lagoons in Jackson Park are a refreshment to many eyes which are weary with sight-seeing and satiated with the architectural splendors of the Fair. In the composition of this improvised bit of Nature, with its pleasing effect of green banks reaching to the water's edge, rare exotics have not been used, but mainly native plants collected in neighboring woods, fields and swamps. The main object was to secure a massive green effect with cheap home material. Among the few foreign trees and shrubs to be detected are the European White Willow, Ailantus, Privet, Tartarian Honeysuckle, Deutzia, Mock Orange (Philadelphus), Forsythia, Tamarix, and very rarely a plant of Hibiscus Syriacus or of Hydrangea paniculata grandiflora. But such species as the Honeysuckle, Philadelphus and Hibiscus have made but little growth in their close proximity to the water, and, among the more vigorous development of native plants, they presented rather a forlorn and dusty appearance at the end of August, when these notes were taken. Much of the herbaceous material which was conspicuous earlier in the season has, in the course of its nature, dwindled away and given place to other and later-developing things. Where Irises once predominated, Sedges, Reeds, Grasses and such plants as Sagittaria are now most conspicuous, and serve to connect the water with the shrubbery on the banks. In a few places where the roots of the shrubs are in the water the foliage presents a poor appearance, having largely fallen, as was also the case with the large decompound leaves of Aralia spinosa, which is sparingly planted on higher ground.

Quick-growing, moisture-enduring plants being the great desideratum, the most dependence was naturally placed on the Willows, but one finds it difficult to credit the statement that a hundred thousand healthy plants of this genus alone were used. Several species have been employed, and they furnish a good illustration of what may be accomplished with our native species, and what different contrasting effects are to be obtained in a range of species varying from the slender habit and narrow light green-colored foliage of Salix longifolia to the broad-leaved, stiff, dark and shining verdure of S. lucida. The European White Willow has been a little used, and is at once distinguished from its American congeners by its usually more robust growth and different aspect.

The American red-branched Cornel, Cornus stolonifera, has been quite commonly planted and generally looks very well; the native Nine-bark, Physocarpus opulifolius, is freely mixed in with the other shrubbery and seems well adapted to its surroundings. Occasional plants of Symphoricarpus are to be seen; here and there the common Elder, Sambucus Canadensis, shows its dark fruit, and a small percentage of native dwarf Sumachs has been included. The foregoing enumeration comprises about all the notable native kinds of shrubs to be seen around the borders of the lagoons. Wild Roses, native or introduced, like the Sweet Brier, may also be seen. Strong young growths of Cottonwood and Balm of Gilead Poplars are very noticeable; the broad leaves of Catalpas are occasionally seen; while the Ailantus is conspicuous by having outstripped the taller shrubs in height, and occasional specimens of Honey Locusts and Silver Maples represent trees of less vigorous growth, which are here merely introduced to increase and maintain the verdurous effect desired, and are not planted as permanent trees. No attempt has been made to group the shrubbery with regard to the density of color of the foliage of different species, and no apparent distinction between simple-leaved and conspicuously pinnate or compound-leaved kinds has been made in the planting or grouping. In fact, except that the taller-growing species are usually in the background, the massing is of a very mixed character.

In quite a number of places the shrubbery has proved a partial failure, probably owing to excessive moisture, and these spots furnish an interesting object-lesson in the value in such places of plants which we are apt to call weeds. A Knotweed, apparently Polygonum Pennsylvanicum, has come up in large quantities and overgrown the lower almost leafless shrubs, presenting a dense compact mass several feet high, and at this time covered with small oblong spikes of little rose-colored flowers. Pigweeds, too, both Chenopodium and Amarantus, have grown taller than their woody-stemmed neighbors, and the green foliage they contribute would be missed if removed. An occasional Wild Evening Primrose is to be seen, with stem and branches stout and shrub-like and gradually opening its pretty yellow flowers. Wild Verbena, Wild Sunflowers, Bidens, Coreopsis and Golden-rod have grown up with the shrubs, usually in sparing numbers, but in some cases plentifully, and at the end of August were in blossom, as were also a few stray examples of Liatris or Blazing-star. In some places the Wild Balsam-apple, Echinocystis lobata, was in full bloom, its long, climbing stems being allowed to grow over everything within reach. Besides many Grasses, which have come up among the shrubbery, little clumps of Maize have been planted in spots where undesirable gaps occurred.

Arnold Arboretum. *J. G. Jack.*

BREVITIES.

Aquatic plants at the World's Fair are shown in four places—the native species in the lagoon borders, in the large tank in front of the Horticultural Building (described on page 379), the small collection shown under the auspices of the New York Florists' Club in the Lord & Burnham greenhouse (see page 399), and the tank in the south court of the Horticultural Building. The last is filled by E. D. Sturtevant, of Bordentown, New Jersey. The four corners of the tank contain clumps of Papyrus, and the Wild Rice, Zizania aquatica, is also prominent. Clumps of Eichornia (or Pontederia) crassipes and the Water-poppy are used with good effect. Limnanthemum Indicum bears good white flowers freely, and is a desirable plant. Sagittaria Montevidiensis is in bloom, but to most people it will pass for our common Arrow-leaf. The variegated form of Scirpus Tabernæmontanus is very effective. The Nymphæas are especially good, and a mere list of them is useful as an inventory of available species for small ponds: Nymphæa Marliacea, with its varieties, chromatella, rosea, carnea and albida; N. Sturtevantii, N. rubra, N. dentata, N. Zanzibarensis and varieties azurea, rosea and superba, N. Devoniensis, N. pygmæa and variety helveola, N. candidissima, N. gracilis, N. Breakleyi, var. rosea, N. odorata, var. sulphurea.

The Begonias of the Rex section, shown by E. G. Hill & Co., at the World's Fair, comprise nearly one hundred varieties, representing the best of those now in cultivation. Among the most meritorious kinds are Count Louis Erdody, Inimitable, Anna Dorner, Minnie Palmer, Madame Lebocq, Bertha McGregor, and a number of distinct seedlings. The plants are large and well arranged, making, altogether, one of the best displays in the Horticultural Building.

The most exact and scientific pomological exhibit in the Horticultural Building is a collection of grapes shown by T. V. Munson. Every species of American Vitis is shown by photographs of the fruit and seeds; by herbarium specimens of leaves and usually of inflorescence; by dried twigs, cut to show the diaphragms at the joints, roots; by fruits preserved in liquids; by sections of old trunks; and, finally, by young plants growing in pots. The exhibit comprises a comprehensive study of the genus, to which Mr. Munson has given himself for many years. From time to time he has exhibited fresh grapes, showing the progress he is making in the origination

of varieties, particularly in his crosses with the Post Oak Grape of the south-west, Vitis Lincecumii. Mr. Munson considers that the outcome of these unions will afford the best grapes of the future; and various experts who have tested the grapes which he has sent to Chicago are ready to concur in the opinion. No other single individual is making a stronger impression upon American horticulture.

Chicago, Ill. *L. H. B.*

Notes.

In a personal letter to the editor of this journal from a competent observer in Carlton, Minnesota, it is stated that the stifling smoke from forest fires there obscures the sun at midday and impedes traffic on the lake just as the densest fogs do.

The Century for October has for its frontispiece an admirable portrait of Mr. Frederick Law Olmsted, and the most interesting article in the number is a sketch by Mrs. Schuyler Van Rensselaer of the life of this artist, with a critical estimate of the value of his work and its influence upon landscape-gardening in America.

We have received a schedule of the Fall Chrysanthemum Show, which is to be held under the auspices of the New York Florists' Club at the Industrial Building, in this city, from the 6th to the 13th of November. The exhibition will include Orchids, Roses and other flowers as well as Chrysanthemums, and a special effort is being made to have a large trade exhibit. Six thousand five hundred dollars are offered as premiums, and as the building affords abundant space, there is no reason why the exhibition should not equal or excel those which have hitherto been held in Madison Square Garden.

From a note in the last number of our excellent contemporary, *Le Journal des Orchidées*, we learn that the family of the late Louis van Houtte is to retire from the management of the great horticultural establishment which made the name of Van Houtte known throughout the world, and did more, perhaps, in its day than any other to make Ghent one of the greatest horticultural centres. The elder Van Houtte, beginning life as a botanical traveler himself, was exceptionally active and enterprising in introducing new plants, especially from tropical countries, which he afterward published in the *Flore des Serres*, one of the most useful publications of its class, which, unfortunately, died with its founder.

Miss Alice E. Stevens and Miss Josephine A. Clark, of Washington, if sufficient encouragement can be obtained, propose to issue to subscribers two card-catalogue indices, one of botanical plates with a bibliography, including references not given in Pritzel's *Iconum Botanicarum Index*, and the other of genera, species and names of plants published since 1885. The names of American species will be issued first as of more immediate value to American botanists. The price per thousand cards has been fixed at the moderate sum of $15, and if ten subscribers are assured early in October it is proposed to issue a thousand cards of each index by the end of that month. Miss Clark's address is 941 S. Street, N. W., Washington, D. C.

It is well known that plants are subject to bacterial diseases. The bacteria which affects the bulbs and leaves of Hyacinths and the one which causes the fire-blight of the Pear are the most familiar instances. It is not generally known, however, that the microbes which produce disease in man can live and multiply in plants. Many experiments, however, have proved that the typhoid bacillus and many others will live in different plants. When the germ which causes anthrax was innoculated into the leaves of the Agapanthus, these bacilli grew into long threads and produced spores not only at the point of innoculation, but within the healthy cells of the soft part of the leaf. After living for forty-two days in the plant, animals were innoculated with germs taken from the plant, and they proved to be as virulent in causing disease as ever. These microbes which cause disease in man or animals, and which will live also in plants, so far as has been tested, do not cause any disease of the plants, and yet the fact that the germs of diphtheria or small-pox or other diseases may be living and multiplying in the plants about us, perhaps in the plants which we eat, suggests unpleasant reflections.

In a late number of the *American Florist* Mr. John N. May describes his method of destroying the aphis or green fly in his Rose-houses by using the vapor of tobacco-juice. He has a small steam boiler of about five-horse power from which an inch and a quarter pipe runs through the centre of the shed, with a half-inch pipe branching into each glass-house. These pipes in the houses a hundred feet long have each two outlets of half-inch valves or double-threaded air-cocks, on which a coupling is screwed, to which is attached a piece of steam hose some two feet long. At the end of the hose a piece of quarter-inch pipe about a foot long is fastened. When the house needs vaporizing, from one to two quarts of tobacco-juice are put into a large tub through a hole in the wooden cover of which the quarter-inch pipe is thrust until it almost touches the bottom. With twenty pounds of steam in the boiler the house can be filled with vapor in twelve or fifteen minutes. Two good applications will destroy every aphis in the house, and will not injure the most tender foliage or the most delicate flower. The reason for having two openings in a pipe is that a large house can be filled so much more quickly than from a single pipe, and a quick application is much more efficacious than a slow one.

The *Gardeners' Chronicle* quotes from a paper by Professor Terrien de Lacouprie, in which he states that the first knowledge of the Quince dates from 700 B. C., when it was introduced from Media into Greece. Soon after there is evidence of its existence in China. The Greeks attributed various virtues to it, and some authors have considered that the apple disputed between Here, Aphrodite and Athene was a quince. By the Hindus and the Mahometans all over the east, the quince is still highly valued, and in China fruits of a large size are brought to Pekin from Shantung. The first appearance of the quince in Chinese literature is, according to the Professor, in an ode dated about 660 B. C., where it is mentioned as forming a complimentary present. Here it is called Mah-Kua, or Tree Gourd, a name also given to the Papaw, but which was introduced many centuries after. The history of the quince is traced for twelve centuries, and its importation by the South Sea traders to the emporia of the south coast of Shantung. It must not, however, be forgotten that quince-like fruits are native to China. Thus, Pyrus japonica in one or other of its forms is found, according to Hemsley, both in the north and south-west of China; while under the name Pyrus Cathayensis, Hemsley, a species is noted, called the "Chinese Quince," by Dr. Henry, and found by that botanist in central China—this is the Cydonia Chinensis of Thouin, and is figured in *Bot. Reg.*, t. 905. Loureiro is said to have confounded this with the common Quince. The Pyrus Sinensis of Lindley (*Bot. Reg.*, t. 1248) is a different plant.

The heavy frosts give warning that the eastern peach-crop is nearly harvested, and much of the fruit offered is small and of inferior quality. This keeps prices down and very excellent peaches from New Jersey have been selling for $1.00 a basket. California fruit is still abundant, and fifty-nine car-loads were sold in this city last week. The principal peaches received from that state now are the Salway, a large cream-yellow freestone peach of English origin, with deep yellow flesh; George's Late Cling, a large white-fleshed peach of California origin, yellow, with bright red stripes and splashes; and the Strawberry peach, which originated in New Jersey. These western peaches were in large supply and sold slowly, but Bartlett pears were quickly bought at prices double those of the previous week. Boxes containing sixty-two Bartletts of large size sold at $2.25 wholesale, and Acmes brought the same price. California figs of excellent quality are now quite common and they sell for fancy prices. The first new crop of stem-cut oranges from Florida were received last week. This fruit, which is picked entirely green, as it has to be artificially ripened is tart and lacks the full rich flavor of mature oranges ripened after Christmas. Five hundred boxes of them, however, were shipped to Liverpool. Shipments have been prohibited from many Mediterranean ports where cholera is epidemic, so that the supply of new-crop dates, Smyrna figs, Sultana raisins, citron peel, walnuts, filberts, lemons and oranges is cut off from a large section of that coast. The prospect is that some of these products will be scarce and dear. Although the so-called Japanese persimmons are seen much more frequently than in former years on the fruit-stands, buyers generally have not learned their value, and, therefore, the demand has not kept up with the supply. Occasionally a box containing a hundred persimmons came to this market a few years ago and sold to the fancy fruit-dealers at six, eight and even nine dollars, but now the same boxes sell slowly at $1.50 or $2.00. Much of the fruit is over-ripe when it arrives, and for this reason as well as for the over-supply, it is left on the dock. A large yellow variety, somewhat conical in shape, is the one most frequently seen here, while in Philadelphia a smaller, round, bright red variety is most common. There is little doubt but that the Kaki can be cultivated here in the Atlantic states, since it flourishes in Japan in a climate quite as rigorous as that of New England. The fruit is destined ultimately to hold a prominent place in our market, as it is handsome, luscious and healthful.